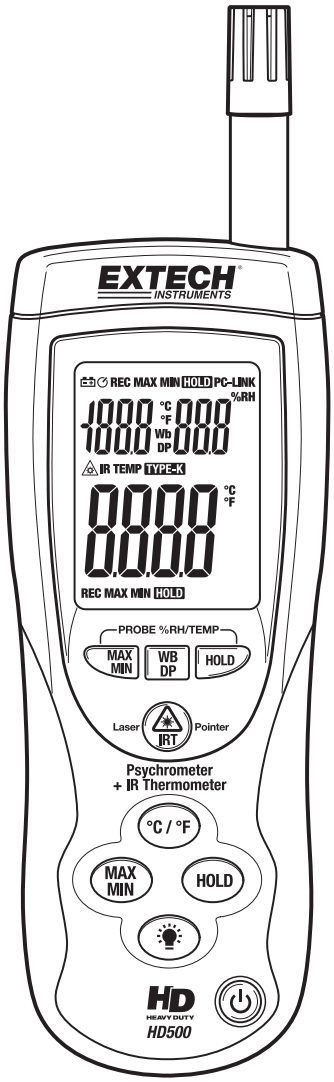
User Guide

EXTECH INSTRUMENTS

Heavy Duty Psychrometer + IR Thermometer

Model HD500



Introduction

Congratulations on your purchase of the Extech HD500 Psychrometer. This handheld meter measures and displays Air Temperature, Relative Humidity, Dew Point, Wet Bulb and also Surface Temperature using the built-in IR thermometer. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

Features

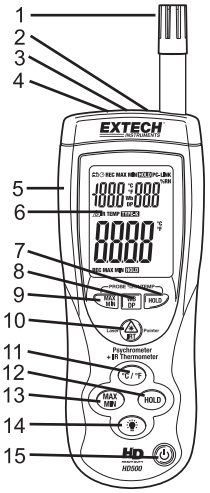
- Triple digital LCD display.
- Fast response, all data is calculated four times per second.
- Standard type k(NiCr-NiAl) Thermocouple input jack suitable for any style of type k probe.
- Infrared thermometer to measure surface temperature.
- Red laser pointer included.
- LCD with Backlight
- Automatic range selection
- USB interface.
- Low battery indication.
- Auto Power off.

Safety

- Use extreme caution when the laser pointer beam is on
- Do not point the beam toward anyone's eye or allow the beam to strike the eye from a reflective surface
- Do not use the laser near explosive gases or in other potentially explosive areas

Meter Description

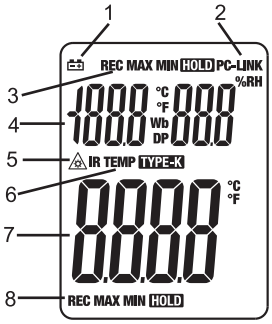
1. Humidity & Air Temperature Sensor
2. Type K Thermocouple input jack
3. Laser pointer beam
4. IR temperature sensor
5. USB Interface
6. LCD Display
7. Upper display HOLD button
8. Upper display Temp./Wet Bulb/Dew Point button
9. Upper display record Max/Min button
10. IR Measurement button
11. °F/°C units button
12. Lower display HOLD button
13. Lower display record Max/Min button
14. Backlight button
15. Power button



NOTE: Battery Compartment, Tilt Stand and Tripod Mount are located on the reverse side of the meter

Display Description

1. Low Battery icon
2. PC communication icon
3. Upper display function icons
4. Upper display
5. Laser pointer icon
6. Lower display function icons
7. Lower display
8. Lower display function icons



Operation

Basic Measurements

1. Press the ⏻ button to turn power on.
2. The upper display will indicate Air Temperature, Wet Bulb Temperature or Dew Point Temperature and % Relative Humidity.
   Press the **WB/DP** button to toggle between Air, WB or DP.
3. The lower display will indicate Type K temperature or IR Temperature.
   Press and hold the **IRT** button to select the IR Thermometer.
   The TYPE-K function will display "-------" if a type k probe is not inserted into the meter.
4. Press the **°C/°F** button to change the temperature units from °C or °F.

Non-contact IR Surface Temperature Measurements

The built-in IR sensor can remotely measure the temperature of most surfaces. The Laser pointer allows the user to aim accurately when taking non-contact measurements.

1. Turn ON the meter using the ⏻ button.
2. The IR sensor and laser pointer are located at the top of the meter.
3. Point the sensor toward the surface to be measured.
4. Press and hold the **IRT** button to begin measuring the surface temperature of a desired target. **IR TEMP** and ⚠ will appear on the display. The laser pointer will switch on to help aim the meter.
5. The measured IR surface temperature will appear on the lower display.
6. When the IRT button is released, the laser pointer will switch off and the reading will freeze (data hold) on the display for approximately 7 seconds.
7. After the 7 second hold time the meter returns to the type k mode.

WARNING: Do not directly view or direct the laser pointer at an eye. Low power visible lasers do not normally present a hazard, but may present some potential for hazard if viewed directly for extended periods of time.

Data Hold

1. Press the **HOLD** buttons (one for upper display and one for lower display) to freeze the displayed value for the respective display. Press again to unlock the display.
2. The **HOLD** icon will appear on the display when the Data Hold mode is active.

MIN-MAX Recording Mode

1. Press the **MAX/MIN** button (one for upper display and one for lower display) to begin recording the Maximum and Minimum reading. The **REC MAX** icon will appear and only the maximum value measured will appear in the display. The display will update only if a value higher than the currently displayed value is measured.
2. Press the **MAX/MIN** button again to display the minimum values. The **REC MIN** icon will appear and only the minimum recorded value will appear in the display.
3. Press the **MAX/MIN** button again to display the currently measured values. The **REC** icon will appear in the display and the Max and Min values will be stored in memory.
4. Press and Hold the **MAX/MIN** button for >2 seconds to exit the mode.

Auto-Power Off

The meter will automatically turn off after 15 minutes of operation if no buttons are pressed during this period. Auto-power off can be disabled by:

1. Hold the **IRT** button and then press the ⏻ button to turn the power on. When "**disAPO**" appears in the display, release the **IRT** button and the APO is disabled.

Low Battery

When the battery reaches the minimum operating voltage the battery icon will appear in the display. Replace the 9V battery when this happens.

Battery Replacement

When the battery icon appears on the LCD, the 9V battery must be replaced.

1. The battery compartment is located on the rear of the meter.
2. Press in and down on the arrow located above the tilt stand hinge.
3. Replace the 9V battery
4. Replace the battery cover.

Backlight

Press the backlight button to turn the backlight ON or OFF.

Note: continuous use of the backlight function will reduce battery life.

USB Interface and Software

The HD500 is equipped with a communication jack on its upper left side. The supplied communications cable connects to this jack and to a USB port on a PC. The supplied software allows the user to view and save readings to the PC. Instructions for use and features are detailed in the supplied software HELP utility.

InfraRed Measurement Considerations

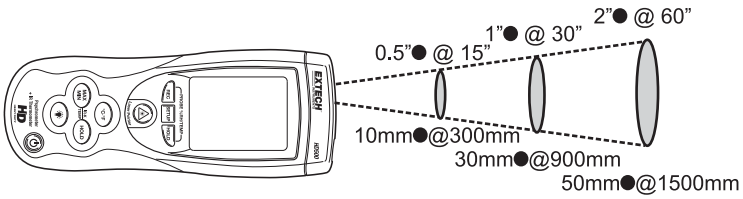
- When taking IR measurements the meter automatically compensates for ambient temperature changes. Note that it may take up to 30 minutes to adjust to extremely wide ambient changes.
- Low temperature measurements quickly followed by high temperature measurements may require several minutes to stabilize as a result of the IR sensor cooling process.
- If the surface of the object under test is covered with frost, oil, grime, etc., clean before taking measurements.
- If an object's surface is highly reflective apply masking tape or flat black paint before measuring.
- Steam, dust, smoke, etc. can obstruct measurements.
- To find a hot spot, aim the meter outside the area of interest then scan across (in an up and down motion) until the hot spot is located.
- IR measurements cannot be made through glass.

IR Theory

IR thermometers measure the surface temperature of an object. The meter's optics sense emitted, reflected, & transmitted energy that is collected and focused onto the meter's detector. The meter's circuitry translates this information into an LCD reading.

IR Field of View

Ensure that the desired target is larger than the spot size. As the distance from an object increases, the spot size of the area measured by the meter becomes larger. The meter's field of view ratio is 30:1, meaning that if the meter is 30 inches (cm) from the target, the diameter (spot) of the object under test must be at least 1 inch (cm). Refer below to the field of view diagram.



Emissivity

Most organic materials and painted or oxidized surfaces have an emissivity of 0.95. Inaccurate readings will result when measuring shiny or polished surfaces. To compensate, cover the surface under test with masking tape or flat black paint. Allow time for the tape to reach the same temperature as the material underneath then measure the temperature of the tape or the painted surface.

Thermal Emissivity Table for Common Materials

Material	Emissivity	Material	Emissivity
Asphalt	0.90 to 0.98	Cloth (black)	0.98
Concrete	0.94	Human skin	0.98
Cement	0.96	Leather	0.75 to 0.80
Sand	0.90	Charcoal (powder)	0.96
Earth	0.92 to 0.96	Lacquer	0.80 to 0.95
Water	0.67	Lacquer (matt)	0.97
Ice	0.96 to 0.98	Rubber (black)	0.94
Snow	0.83	Plastic	0.85 to 0.95
Glass	0.85 to 1.00	Timber	0.90
Ceramic	0.90 to 0.94	Paper	0.70 to 0.94
Marble	0.94	Chromium oxides	0.81
Plaster	0.80 to 0.90	Copper Oxides	0.78
Mortar	0.89 to 0.91	Iron Oxides	0.78 to 0.82
Brick	0.93 to 0.96	Textiles	0.90

Specifications

General Specifications

Display	Dual Display Multi-function LCD with 9999 counts
Data Hold	Freezes displayed reading
Sampling rate	1 reading per second
Sensors	Relative Humidity: Capacitance, Air Temp: Thermistor
IR Distance to Spot ratio	30:1
IR Spectral response	6 to 14µm
IR Emissivity	0.95 fixed
MIN-MAX	Record and Recall lowest and highest readings
Auto Power OFF	Automatic shut off after 15 minutes (can be disabled)
PC Interface	USB PC Communication with supplied software and cable for data acquisition
Over range indication	Dashes appears on the LCD
Low battery indication	Battery symbol appears on the LCD
Power supply	9V Battery
Operating conditions	Meter: 32 to 122°F (0 to 50°C); 80% RH max.
Dimensions / Weight	Main instrument: 10.1 x 3.0 x 2" (257 x 76 x 53mm)
Weight	12.5 oz. (355g)

Range Specifications

Function	Range	Resolution	Accuracy
Temp (type-K)	-148°F to -20°F	1°≥1000 0.1°<1000	±(3.0% reading + 4°F)
	-20°F to 2501°F		±(3.0% reading + 2°F)
	-100°C to -30°C		±(3.0% reading + 2°C)
	-30°C to 1372°C		±(3.0% reading + 1°C)
IR Temp	-58 to -4°F -50 to -20°C	0.1°F/°C	±9.0°F / 5.0°C
	-4 to 932°F -20 to 500°C	0.1°F/°C	±2% reading or ±4°F/2°C
Air Temp.	-4 to 140°F -20 to 60°C	0.1°F/°C	±(2% reading + 2°F/1°C)
%RH	10% to 90%	0.1%RH	±2% RH
	<10% and >90%	0.1%RH	±3% RH
Wet Bulb	-6.88 to 140°F -21.6 to 60°C	0.1°F/°C	calculated
Dew Point	-90.4 to 140°F -68 to 60°C	0.1°F/°C	calculated

Warranty

EXTECH INSTRUMENTS CORPORATION *warrants this instrument to be free of defects in parts and workmanship for* ***three (3) years*** *from date of shipment (a six month limited warranty applies to sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department at (781) 890-7440 ext. 210 for authorization or visit our website www.extech.com for contact information. A Return Authorization (RA) number must be issued before any product is returned to Extech. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. Extech specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. Extech's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.*

Calibration and Repair Services

Extech offers repair and calibration services for the products we sell. Extech also provides NIST certification for most products. Call the Customer Care Department for information on calibration services available for this product. Extech recommends that annual calibrations be performed to verify meter performance and accuracy.

Support line (781) 890-7440

Technical support: Extension 200; E-mail: support@extech.com

Repair & Returns: Extension 210; E-mail: repair@extech.com

Product specifications subject to change without notice

For the latest version of this User's Guide, Software updates, and other up-to-the-minute product information, visit our website: www.extech.com

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